THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF NORTH CAROLINA

UNITED STATES OF AMERICA,	)	
	)	
Plaintiff,	)	
	)	
ENVIRONMENTAL DEFENSE, NORTH CAROLINA SIERRA CLUB, and NORTH CAROLINA PUBLIC INTEREST RESEARCH GROUP	)	
	)	
Plaintiff-Intervenors,	)	
	)	
v.	)	Civil Action No. 1:00 CV 1262
	)	
DUKE ENERGY CORPORATION	)	
	)	
Defendant.	)	

Plaintiffs' Supplemental Memorandum in Support of Motion for Summary Judgment on all Remaining Claims (the "Plant Modernization Program" Claims)

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This is a civil enforcement action for violations of the Clean Air Act at thirteen coal-fired electricity generating units in North Carolina. Plaintiffs contend that Duke Energy violated the Act's Prevention of Significant Deterioration (PSD) provisions when it modified these thirteen units without also installing modern pollution controls. Pursuant to the Court's request, Plaintiffs hereby submit this supplemental memorandum on facts concerning the "routine maintenance" and "emissions increase" issues.

OVERVIEW OF THE TWO ISSUES

Routine maintenance: Duke asserts that its modifications are covered by a PSD exception for "routine maintenance, repair, or replacement." This exception is not found in the statute, which applies to "any" physical change; rather, it is an administrative exception implemented through EPA's PSD rules. *New York v. EPA*, 443 F.3d 880, 88-90 (D.C. Cir. 2006). As such, the exception is "very narrow" and requires a "common-sense" evaluation of an activity's "nature, extent, purpose, frequency, and cost." Pls. SJ Br. (ECF 435), at 13-14. Duke bears the burden on the routine maintenance defense, and Plaintiffs contend that Duke cannot meet that burden for the massive, multi-million dollar modifications at issue here. *Id.* at 13-20.[1]

[1] During a recent teleconference, the Court asked if Plaintiffs had a "routine maintenance" report like one prepared for Duke by William Tuppeny. Mr. Robert Koppe prepared such a report for Plaintiffs (attached as Ex. 45 to Plaintiffs' opposition brief (ECF 436-2)), in which he describes Duke's projects and his opinion that they were not routine. While the facts in this case compel entry of summary judgment for Plaintiffs without the need for expert testimony, Plaintiffs note that Mr. Tuppeny merely opined that Duke's projects involved work "that is commonly performed in the industry." *E.g.*, Def. SJ Opp. Br. (ECF 438-4), at 19-20. That is not the test for routine maintenance. *United States v. Duke Energy Corp.*, Civ. No. 00-1262, 2010 WL 3023517, *7 (M.D.N.C. July 28, 2010).

Emissions Increase: PSD applies when a modification "would [significantly] increase the actual annual emission of a pollutant above the actual average for the two prior years." *Envtl. Def. v. Duke Energy Corp.*, 549 U.S. 561, 569 (2007). Plaintiffs contend that Duke should have expected such an increase at each unit. The pre-change "baseline" emissions were zero, because each unit was shut down for at least three years and thus had no actual emissions during the two-year baseline period. A "zero" baseline is required by the law and facts of this case. Pls. SJ Br. (ECF 435), at 21-28.[2] The units were not sitting idle waiting to be turned back on at a moment's notice – they underwent renovations that Duke said were *required* to return them to reliable service. Duke thus unquestionably "caused or enabled" emission increases. *Duke Energy*, 2010 WL 3023517 at *5. Because Duke's own emission calculations exceed the PSD "significance" levels for each unit, summary judgment is appropriate on all thirteen claims. Pls. SJ Br. (ECF 435), at 12, 29-30.[3]

SUPPLEMENTAL DISCUSSION OF MATERIAL FACTS

Each one of Duke's thirteen modifications was part of a comprehensive life-extension program known as the "Plant Modernization Program" or "PMP." The units

[2] In limited circumstances not applicable here, where sources have requested an alternate baseline as part of a PSD determination, EPA has allowed use of an alternate two-year baseline drawn from the prior five years rather than the immediately prior two years. *Id.* However, for shut-down units like Duke's, the baseline cannot extend back to pre-shutdown operations. *Id.*; *see* 57 Fed. Reg. 32,314, 32,325 (July 21, 1992) (refusing to change PSD rules to allow idled plants to use pre-shutdown operations for baseline).

[3] The parties dispute whether emissions increased using a non-zero baseline; resolving that dispute (which is not material if a zero baseline applies) would require presentation of competing emission estimates. *Id.* at 30 n.37; Pls. Opp. (ECF 437), at 29 & n. 28.

were at or near the end of their initial design lives and were removed from service for between three and ten years while Duke modernized them, effectively adding over 1,000 megawatts (MW) of new capacity to its fleet without ever undergoing PSD review. Because all the modifications were part of the PMP, they share many common facts relevant to the routine maintenance and emissions issues. Such facts are discussed in Section I, while Section II contains additional unit-by-unit detail.

I. Common Facts Applicable to Each One of the PMP Claims

Ten of the thirteen units were shut down in 1984: Allen 1 and 2, Buck 3, 4, and 5, Cliffside 1, 2, 3, and 4, and Riverbend 6. Pls. SJ Br., Ex. 7 (ECF 435-8). Duke removed these units from its fleet due to their "advanced age and condition." *Id*. It told the North Carolina Utilities Commission (NCUC) in 1985 that these units "cannot provide reliable service until major repairs can be performed," and that a "comprehensive" renovation program was the "only way" they could return to service. Pls. SJ Br., Ex. 18 (ECF 435-19), at 50-51. The other three units (Dan River 3 and Riverbend 4 and 7) were not part of the 1985 NCUC proceedings, but were formally added to the same PMP program very shortly thereafter in 1986 and 1987. Pls. SJ Br., Ex 8 (ECF 435-9), at 2ARCH0001135.

In 1991 (after all thirteen units had been placed in the PMP) Duke again described the PMP in testimony to the NCUC. As Duke explained, the PMP was a life-extension program to allow "older coal fired units . . . to operate well beyond their expected retirement at the end of their initial design life." Pls. SJ Br., Ex. 13 (ECF 435-14), at 2LL0001296. Duke's description was consistent with its prior 1985 NCUC testimony, in

which it had described the purpose of the PMP as involving "life-extension efforts" that were designed to "add capacity" to Duke's system. Pls. SJ Br., Ex. 12 (ECF 435-13), at 2LL0000174. It was also consistent with its original PMP "Strategy Statement," which characterized the PMP as a way to add "new capacity." Pls. SJ Br., Ex. 5 (ECF 435-6).

Duke again described all of the PMP renovations in a 1991 submission to the Federal Energy Regulatory Commission (FERC). In response to a FERC inquiry after all thirteen units had been placed in the PMP, Duke told FERC that all the "units that have been placed in the PMP program were units that would have been retired." Pls. SJ Br., Ex. 21 (ECF 435-22), at 2GO610000092. Instead of retiring the deteriorated units and building new plants, however, Duke said it performed studies "to determine whether or not the units could be put in a condition of being ready for service." *Id.* Duke said it initiated the renovations after it determined that "refurbishing the units was much more cost effective than building expensive new capacity." *Id.*

In response to another question from FERC, Duke confirmed that the work performed at each unit was "not maintenance" but rather involved capital expenditures that were "required to bring the unit in readiness to operate as an efficient, useful, and reliable source of capacity." *Id.* at 2GO610000093. Duke identified the work it considered "not maintenance" as including, *inter alia*, "turbine and generator rotor replacement," "generator stator rewinding," "control and instrumentation systems replacement," "boiler tube replacement," "feedwater heater replacement," and "condenser tube replacement." *Id.* at 2GO61000092. This was the same type of work

identified in Duke's earlier NCUC testimony. Pls. SJ Br., Ex. 12 (ECF 435-13), at 2LL0000173 (testifying that many components must be specially manufactured, involving lead times ranging from several months to as much as 36 months).

Facts concerning all thirteen PMP claims are also found in other Duke documents. To extend the life of the units, Duke performed months-long "upgrade and reliability" studies. Def. MIL, Ex. 56 (ECF 431-13), at GO1000029. In a paper discussing the results of the first of these studies, entitled "Fossil Plant Extension of Life Studies: The Duke Approach and the Results," Duke described its efforts as involving "a different approach than routine plant maintenance." Pls. SJ Br., Ex. 30 (ECF 435-31), at EP03673.

Similarly, in a 1989 update on the PMP, Duke said the renovations at all thirteen units would allow them to operate "for an additional 20 years" and involved replacement of "worn out, obsolete equipment." Pls. SJ Br., Ex. 8 (ECF 435-9), at 2ARCH0001134. The same update said the units required "extended maintenance outages to accommodate upgrade and modernization activities." *Id.* at 2ARCH0001136. A 1990 status report characterized the PMP work as "a major capital investment" that "would be treated as a major project." Def. MIL, Ex. 56 (ECF 431-13), at GO1000030.

The thirteen renovations ultimately cost more than $300 million; the unit average was approximately $245 per kilowatt, and even the least expensive exceeded $17 million. Pls. SJ Br., Ex. 20 (ECF 435-21), at MS0003974-75. Each renovation easily exceeded the $1 million cost threshold (subsequently raised to $5 million) for requiring approval of

Duke's Executive Committee – the very highest level of approval required for capital projects at the time. *See* Def. Supp Resp. to Rog. 129 (Pls. Ex. 70), pp. 39-40.[4]

II. Additional Unit-Specific Facts

Allen 1 (Claim 11): Duke spent five months, from January to May 1985, on an "upgrade and reliability study" at the Allen plant. Def. MIL, Ex. 56 (ECF 431-13), at GO10000029. As with the studies at all the plants, an extensive team was appointed to determine the refurbishments, upgrades, and design changes necessary for life extension. Pls. SJ Br., Ex. 30 (ECF 435-31), at EP003680-82. Afterwards, Duke told the NCUC that to return to service, Allen 1's "boiler has to be modified and upgraded in several areas" and that it needed new feedwater heaters, repair or replacement of turbine rotors, and reinsulation of a generator rotor. Pls. SJ Br., Ex. 14 (ECF 435-15), at 2LL0001148. Duke budgeted $21,670,000 for a major renovation, including new feedwater heaters (requiring 178 installation days), turbine repairs (56 days), generator reinsulation (180 days), a new unit control system (180 days), and over 20 other items. Def. MIL, Ex. 56 (ECF 431-13), at GO10000031-32. By 1989, the work had expanded to include another $3,673,000 for boiler repairs. Pls. SJ Br., Ex. 8 (ECF 435-9), at 2ARCH0001141.

Duke ultimately replaced both sections of the unit's massive reheater (comprising 370 tubes in assemblies more than 20 feet tall), the unit's four 43-foot tall burner corner panels, and other portions of the boiler, including 6,400 feet of bottom ash hopper tubes.

[4] The interrogatory responses attached to Plaintiffs' original briefing omitted two Duke supplementations. Duke's Supplemental and Second Supplemental Responses are attached hereto as Exs. 70 and 71 (numbering continues from the original briefing).

Ex. 70, Def. Supp. Resp. to Rogs. 119, 121, 127, pp. 10, 12-13, 28-29. Duke also replaced the unit's inefficient control system, which was unable to meet modern requirements, the ignition system, and five feedwater heaters (each over 30 feet long). *Id.* at pp. 12, 24 (Rogs. 121, 126). The Allen 1 outage lasted over six years, until August 1990. Pls. SJ Br., Ex. 3 (ECF 435-4), at GRARPTDU124. The final cost of the 1990 Allen 1 PMP was $23,619,349 or $143 per kilowatt. Pls. SJ Br., Ex. 20 (ECF 435-21), at MS0003974-75. The original cost in 1957 to build the 165 MW unit was $18 million.[5]

Allen 2 (Claim 9): After the Allen upgrade study described above, Duke told the NCUC that to return to service, Allen 2 needed "modifications and upgrading of its boiler," new feedwater heaters, reinsulation of its generator rotor, and rewinding of its generator stator. Pls. SJ Br., Ex. 14 (ECF 435-15), at 2LL0001148. Duke budgeted $17,125,000 for the required renovations, including two new feedwater heaters (60 days), generator rotor and stator repairs (135 days), a new unit control system (180 days), and over 20 additional items. Def. MIL, Ex. 56 (ECF 431-13), at GO10000033-34. By 1989, the required renovations also included a $3,831,000 line item for boiler repairs. Pls. SJ Br., Ex. 8 (ECF 435-9), at 2ARCH0001141.

As at Allen 1, Duke ultimately replaced both sections of the boiler's massive reheater and the boiler's four 43-foot tall burner corner panels. Ex. 70, Def. Supp. Resp. to Rogs. 119, 121, 127, pp. 10, 13, 29. Duke also replaced the unit's antiquated control

[5] The size, initial operation date, and original cost of each unit is set forth in Plaintiffs' summary judgment briefing. Pls. SJ Br. (ECF 435), at 6, Statement of Fact 1.

system, ignition system, and four feedwater heaters. *Id.* at pp. 13, 24-25 (Rogs. 121, 126). The unit was shut down for over five years, until April 1989, Pls. SJ Br., Ex. 3 (ECF 435-4), at GRARPTDU127, and was thus the first of the thirteen PMP units at issue to return to service. To determine best practices for resuming operations after renovating such long-laid up units, Duke investigated whether other utilities had performed a boiler cleaning procedure known as a "steam blow" in similar circumstances, but determined that there was simply "not much experience in the industry" to draw from. Pls. SJ Br., Ex. 31 (ECF 435-32), at 1GO380000334, 336. The final cost of the 1989 Allen 2 PMP was $23,082,997 ($140 per kilowatt). Pls. SJ Br., Ex. 20 (ECF 435-21), at MS0003974-75. The original 1957 cost to build the entire 165 MW unit was $18 million. *Supra* n.5.

Buck 3 (Claim 23): In 1985, Duke told the NCUC that Buck 3 was "too dangerous to operate under any circumstances" due to a condemned generator rotor and that the boiler required "major replacements" to return to service. Pls. SJ Br., Ex. 14 (ECF 435-15), at 2LL0001148-49. Duke thereafter spent eight months, from August 1987 to March 1988, performing an "upgrade and reliability study" to identify what needed to be done at the Buck plant, including Buck 3 and the other units at issue. Def. MIL, Ex. 56 (ECF 431-13), at GO1000029. Duke initially budgeted $10,693,000 for required renovations at Buck 3, including replacement of the turbine rotor (56 installation days), generator rotor (60 days), and boiler repairs (120 days). *Id.* at GO10000035.

Duke ultimately did even more work. Among other things, it comprehensively renovated the boiler's deteriorated waterwalls and "inadequate" backpass section (which

included replacing both banks of the entire 16 foot tall superheater), and replaced the unit's "unsafe" ignition system and four 30 foot feedwater heaters. Pls. SJ Br., Ex. 24 (ECF 435-25), pp. 10, 12-13, 24-25, 39 (Rogs. 119, 121, 126, 128). Several linear miles worth of boiler tubes were replaced in the waterwalls and boiler backpass. *Id.* at p. 29 (Rog. 127). The Buck 3 outage lasted over ten years, until July 1994. Pls. SJ Br., Ex. 3 (ECF 435-4), at GRARPTDU150. The final cost of the 1994 Buck 3 PMP was $34,437,244 or $430 per kilowatt. Pls. SJ Br., Ex. 20 (ECF 435-21), at MS0003974-75. The original cost in 1941 to build the entire 75 MW unit was $3.9 million. *Supra* n.5.

Buck 4 (Claim 21): In 1985, Duke told the NCUC that for Buck 4 to return to service, "[m]ajor portions of the boiler water walls of the boiler superheater and of the drum circulation system must be replaced," and that the unit needed reinsulation of its generator rotor and rewinding of its generator stator. Pls. SJ Br., Ex. 14 (ECF 435-15), at 2LL0001149. Duke initially budgeted $15,153,000 for the renovations, which included new generator rotors (56 days) and boiler tube replacements (84 days). Def. MIL, Ex. 56 (ECF 431-13), at GO10000036. As at Buck 3, Duke completely renovated the unit. It renovated the boiler's deteriorated waterwalls and "inadequate" backpass section (including replaced the entire superheater), replaced the unit's "unsafe" ignition system, and replaced three 30 foot feedwater heaters. Pls. SJ Br., Ex. 24 (ECF 435-25), pp. 9, 13, 25, 39-40 (Rogs. 119, 121, 126, 128). Several linear miles worth of boiler tubes were replaced in the waterwalls and boiler backpass. *Id.* at 29-30 (Rog. 127). Buck 4 was out of service for over ten years, until January 1995. Pls. SJ Br., Ex. 3 (ECF 435-4), at

GRARPTDU152. The final cost of the 1995 Buck 4 PMP was $17,659,518 or $441 per kilowatt. Pls. SJ Br., Ex. 20 (ECF 435-21), at MS0003974-75. The original cost in 1942 to build the entire 38 MW unit was $2.4 million. *Supra* n.5.

Buck 5 (Claim 19): In 1985, Duke told the NCUC that Buck 5 needed generator repairs and that "[m]ajor portions of the boiler's water walls . . . and the reheater tubes have got to be replaced" for the unit to be returned to reliable service; at most, Duke thought it could have been available for "limited duty for emergencies only." Pls. SJ Br., Ex. 14 (ECF 435-15), at 2LL0001149-50. Even that assessment turned out to be too optimistic, as Duke subsequently identified even more problems, including a condemned generator rotor, and budgeted $13,181,000 for required renovations. Def. MIL, Ex. 56 (ECF 431-13), at GO10000037-38. The renovations included a new turbine rotor (56 days), new unit control system (180 days), a replacement for the condemned generator rotor (60 days), and new boiler tubes (180 days). *Id.* Duke ultimately renovated virtually all parts of the unit. It rebuilt massive sections of the waterwalls (the 100 foot high tubes comprising the outside structure of the boiler), superheater, reheater, and economizer sidewalls, and replaced the generator rotor, the "outdated" ignition system, and five cracked feedwater heaters. Pls. SJ Br., Ex. 24 (ECF 435-25), pp. 9, 14, 25, 30-31, 40 (Rogs. 119, 121, 126-128). The waterwall replacements alone involved almost 1,000 tubes, each over 100 feet long. *Id.* at 30 (Rog. 127). Duke also retubed the unit's condenser (a massive 40 by 20 by 20 foot structure). *Id.* at 9, 26 (Rogs. 119, 126). The Buck 5 outage lasted over six years, until January 1991. Pls. SJ Br., Ex. 3 (ECF 435-4),

at GRARPTDU154. The final cost of the 1991 Buck 5 PMP was $36,073,112 or $288 per kilowatt. Pls. SJ Br., Ex. 20 (ECF 435-21), at MS0003974-75. Originally constructing the entire 128 MW unit had cost $12.75 million in 1953. *Supra* n.5.

Cliffside 1 (Claim 41). In 1985, Duke told the NCUC that Cliffside 1 needed to have its condenser retubed, feedwater heaters replaced, and generator stator rewound in order to return to service. Pls. SJ Br., Ex. 14 (ECF 435-15), at 2LL0001150. Duke subsequently spent nine months, from April 1988 to December 1988, performing an "upgrade and reliability study" to identify all the required renovations at the Cliffside plant. Def. MIL, Ex. 56 (ECF 431-13), at GO10000029. Duke budgeted $15,702,000 for renovations, including new generator rotors (56 days), a new unit control system (180 days), and over ten other items. *Id.* at GO10000039. Duke ultimately refurbished essentially the entire unit. It renovated the major components of the boiler, including the boiler's deteriorated waterwalls and "inadequate" backpass section (which included replacing the entire superheater), and replaced the ignition system and three feedwater heaters. Def. Second Supp. Resp. to Rogs 119, 121, 126, 128 (attached hereto as Ex. 71), pp. 9, 11, 18, 24. Over a mile's worth of boiler tubes was replaced in the waterwalls and boiler backpass. *Id.* at 20-21 (Rog. 127). The Cliffside 1 outage lasted over ten years, until June 1994. Pls. SJ Br., Ex. 3 (ECF 435-4), at GRARPTDU158. The final cost of the 1994 Cliffside 1 PMP was $19,658,856 or $491 per kilowatt. Pls. SJ Br., Ex. 20 (ECF 435-21), at MS0003974-75. The entire 38 MW unit was built in 1940 for $2.3 million. *Supra* n.5.

Cliffside 2 (Claim 33): In 1985, Duke told the NCUC that Cliffside 2 needed to have its condenser retubed, feedwater heaters replaced, and both the generator stator and rotor rewound in order to return to service. Pls. SJ Br., Ex. 14 (ECF 435-15), at 2LL0001150. Duke budgeted $15,996,000 for renovations, including new generator rotors (56 days), a new unit control system (180 days), and over ten other items. Def. MIL, Ex. 56 (ECF 431-13), at GO10000040. As at Cliffside 1, Duke renovated the boiler's deteriorated waterwalls and "inadequate" backpass section (which included over a mile's worth of new tubes and an entirely new superheater), installed a new ignition system and replaced three large feedwater heaters. Ex. 71, Def. Second Supp. Resp. to Rogs 119, 121, 126-128, pp. 9, 11-12, 18, 21, 24-25. The outage lasted over nine years, until February 1994. Pls. SJ Br., Ex. 3 (ECF 435-4), at GRARPTDU160. The final cost of the 1994 Cliffside 2 PMP was $22,879,177 or $572 per kilowatt. Pls. SJ Br., Ex. 20 (ECF 435-21), at MS0003974-75. The entire 38 MW unit was built in 1940 for $2.3 million. *Supra* n.5.

Cliffside 3 (Claim 35): In 1985, Duke told the NCUC that a portion of the Cliffside 3 turbine was cracked and needed to be replaced, that the unit needed new feedwater heaters, that the generator needed to be rewound, and that the generator rotor needed to be reinsulated for the unit to return to service. Pls. SJ Br., Ex. 14 (ECF 435-15), at 2LL0001150-51. Duke budgeted $12,174,000 for renovations, including a unit control system (180 days), generator repairs (60 days), and turbine repairs (180 days). Def. MIL, Ex. 56 (ECF 431-13), at GO10000041. The work that was ultimately

performed included a comprehensive renovation of the unit, including removal of massive sections of the unit's waterwalls (the water tubes comprising the outside structure of the boiler) and installation of new sections, installation of a new 31 foot tall outlet pendant superheater and new upper section of the economizer, and replacement of the unit's cracked turbine, ignition system, and four feedwater heaters. Ex. 71, Def. Second Supp. Resp. to Rogs 119, 121, 126-128, pp. 9, 12-13, 19, 22, 25. The waterwall construction alone involved the removal and installation of 400 tubes, each close to 100 feet long, comprising the four walls of the boiler. *Id.* at 22 (Rog. 127). The Cliffside 3 outage lasted over six years, until December 1991. Pls. SJ Br., Ex. 3 (ECF 435-4), at GRARPTDU162. The final cost of the 1991 Cliffside 3 PMP was $28,540,271 or $439 per kilowatt. Pls. SJ Br., Ex. 20 (ECF 435-21), at MS0003974-75. The entire 61 MW unit cost approximately $5.15 million in 1948. *Supra* n.5.

Cliffside 4 (Claim 37): In 1985, Duke told the NCUC that Cliffside 4 needed rewinding of the generator stator, reinsulation of the generator rotor, and new feedwater heaters in order to return to service. Pls. SJ Br., Ex. 14 (ECF 435-15), at 2LL0001151. Duke initially budgeted $4,064,000 for the renovations. Def. MIL, Ex. 56 (ECF 431-13), at GO1 0000042. By 1989, after completion of the Cliffside upgrade study, the extent of the required work increased significantly to $19,445,000, including repair or replacement of feedwater heaters, plant controls, turbine/generator/rotors, and boiler repairs. Pls. SJ Br., Ex. 8 (ECF 435-9), at 2ARCH0001141. Duke renovated major components throughout the boiler: it replaced 400 waterwall tubes, the 31 foot tall outlet pendant

superheater, and the unit's 6 by 14 foot upper economizer. It also replaced the ignition system and four 30 foot-long feedwater heaters. Ex. 71, Def. Second Supp. Resp. to Rogs 121, 126-128, pp. 13, 19, 22-23, 25. Over a mile's worth of boiler tubes was replaced. *Id.* at 22-23. The Cliffside 4 outage lasted over seven years, until April 1991. Pls. SJ Br., Ex. 3 (ECF 435-4), at GRARPTDU164. The final cost of the 1991 Cliffside 4 PMP was $21,796,573 or $335 per kilowatt. Pls. SJ Br., Ex. 20 (ECF 435-21), at MS0003974-75. The entire 61 MW unit cost $5.15 million in 1948. *Supra* n.5.

Dan River 3 (Claim 43): Unlike the units discussed so far which were all shut down in 1983, Dan River 3 was placed in the PMP in 1986. Pls. SJ Br., Ex. 8 (ECF 435-9), at 2ARCH0001135. Like the other units, Duke undertook a comprehensive upgrade and reliability study to identify "all modifications required for a twenty year extension of life" for the unit. Pls. SJ Br., Ex. 30 (ECF 435-31), at EP003676. Duke initially budgeted $4,531,000 for these modifications. Def. MIL, Ex. 56 (ECF 431-13), at GO10000044. By 1989, the necessary work had increased to $18,821,000, including "upgrade and modernization" of plant controls, boiler repairs, feedwater heaters, and turbine/generator/rotors. Pls. SJ Br., Ex. 8 (ECF 435-9), at 2ARCH0001136, 41. Duke ended up comprehensively renovating the entire unit, including replacing massive amounts of waterwalls (910 tubes between 66 and 78 feet in length comprising the outside structure of the boiler), the unit's primary superheater, pendant reheater, and "outdated" ignition system, and two feedwater heaters. Duke also renovated the unit's

economizer, including by adding new surface area that was never there before. Ex. 70, Def. Supp. Resp. to Rogs 119, 121, 126-128, pp. 10, 15, 26, 32-33, 38.

A memo summarizing the renovations characterized all of this work as involving "major" repairs and replacement of "worn," "aged," and "obsolete" equipment that were required to "make the unit reliable for system dispatch." July 25, 1989 Memo (attached hereto as Ex. 72), at ARCH0001104. The same memo characterized the nature of the PMP work as "abnormal," and noted that the sheer "number of personnel on site and the number of work activities to plan and schedule taxed the plant's facilities and ability to plan, schedule, and supervise the work." *Id.* at ARCH0001108. The outage lasted over three years, until June 1989. *Id.*at ARCH0001104. The final cost of the 1989 Dan River 3 PMP was $21,269,475 or $141 per kilowatt. Pls. SJ Br., Ex. 20 (ECF 435-21), at MS0003974-75. The original cost in 1955 to build the 142 MW unit was $15 million. *Supra* n.5.

Riverbend 4 (Claim 49): Duke spent nine months, from September 1986 to May 1987, performing an "upgrade and reliability study" to identify required renovations at the Riverbend plant, before placing Riverbend 4 in the PMP in August 1987. Def. MIL, Ex. 56 (ECF 431-13), at GO10000029; SJ Br., Ex. 8 (ECF 435-9), at 2ARCH0001135. Duke budgeted $13,662,000 for the required work. Pls. SJ Br., Ex. 8 (ECF 435-9), at 2ARCH0001141. As with the other PMP renovations, Riverbend 4 was comprehensively renovated. Among other things, Duke replaced the unit's 442 water wall tubes (the tubes which comprise the whole outside structure of the four sides of the boiler), as well as the

unit's pendant reheater, three feedwater heaters, and the controls and ignition systems. Ex. 70, Def. Supp. Resp. to Rogs 119, 121, 126-128, pp. 11, 15-16, 26, 33, 38. Duke identified the goal of this work as allowing the unit to operate "for an additional 20 years" by replacing "worn out, obsolete equipment." Pls. SJ Br., Ex. 8 (ECF 435-9), at 2ARCH0001134. The outage lasted over three years, until May 1990. Pls. SJ Br., Ex. 3 (ECF 435-4), at GRARPTDU183. The final cost for the 1990 Riverbend PMP was $17,191,245 or $172 per kilowatt. Pls. SJ Br., Ex. 20 (ECF 435-21), at MS0003974-75. The original cost to build the entire 95 MW unit in 1952 was $7.1 million. *Supra* n.5.

Riverbend 6 (Claim 51): In 1985, Duke told the NCUC that Riverbend 6 needed generator renovations, that a portion of its turbine might be cracked, that some of the feedwater heaters and "major portions of the water wall tubes in the boiler" needed replacement, and that the unit was in such bad shape that it could be used only in "extreme emergency conditions for only a few times." Pls. SJ Br., Ex. 14 (ECF 435-15), at 2LL0001152. After Duke completed the formal Riverbend plant upgrade study discussed above, even more problems were identified. By 1989, the extent of the required renovations had increased to $26,148,000 for boiler repairs, plant controls, and work on turbine/generator/rotors. Pls. SJ Br., Ex. 8 (ECF 435-9), at 2ARCH0001141.

Duke ultimately comprehensively renovated the entire unit. Among other renovations, Duke replaced the unit's 974 water wall tubes (comprising the whole outside structure of the four sides of the boiler), both banks of the primary superheater, and both portions of the pendant reheater. Duke also replaced the low and high pressure turbine

rotors, three feedwater heaters, and an "unreliable and inefficient" ignition system. Ex. 70, Def. Supp. Resp. to Rogs 119, 121, 126-128, pp. 11, 16-17, 26-27, 33-35, 39. The Riverbend 6 outage lasted over seven years, until June 1991. Pls. SJ Br., Ex. 3 (ECF 435-4), at GRARPTDU186. The final cost for the 1991 Riverbend 6 PMP was $34,749,721 or $261 per kilowatt. Pls. SJ Br., Ex. 20 (ECF 435-21), at MS0003974-75. The entire 133 MW unit cost $12.4 million in 1954. *Supra* n.5.

Riverbend 7 (Claim 53): Duke placed Riverbend 7 in the PMP in October 1986, shortly after starting the Riverbend upgrade and reliability study. SJ Br., Ex. 8 (ECF 435-9), at 2ARCH0001135. Duke budgeted $22,465,000 for the required renovations, which were required to allow the unit to operate "for an additional 20 years" by replacing "worn out, obsolete equipment." Pls. SJ Br., Ex. 8 (ECF 435-9), at 2ARCH0001134, 41. As at Riverbend 6, the work that was ultimately performed was a comprehensive renovation of the entire unit. Among other things, Duke replaced the unit's 974 water wall tubes (comprising the whole outside structure of the four sides of the boiler), both banks of the primary superheater, and both portions of the pendant reheater. Duke also replaced the low and high pressure turbine rotors, five feedwater heaters, and an unsafe ignition system. Ex. 70, Def. Supp. Resp. to Rogs 119, 121, 126-128, pp. 11, 17, 27, 35, 39. The outage lasted for six years, until February 1993. Pls. SJ Br., Ex. 3 (ECF 435-4), at GRARPTDU189. The final cost for the 1993 Riverbend 7 PMP was $34,751,433 or $261 per kilowatt. Pls. SJ Br., Ex. 20 (ECF 435-21), at MS0003974-75. The entire 133 MW unit cost $12.4 million in 1954. *Supra* n.5.

III. Conclusion and Table Summarizing the Claims

Plaintiffs present below a table summarizing the PMP claims.[6] In short, Duke modernized, upgraded, and gave new life to old, significantly deteriorated units that otherwise would have been retired, through a comprehensive program of multi-million dollar capital improvements, the express purpose of which was to add generating capacity to its system at a cost lower than would be required to construct new units with air pollution controls. Such modernizations are far beyond the narrow range of activities contemplated by the routine maintenance exception. Rather, they are exactly the kind of "extensive replacement of deteriorated generating systems" that should require PSD review. *Wisc. Elec. Power Co. v. Reilly*, 893 F.2d 901, 910 (7th Cir. 1990) (*WEPCo*).

Duke expected – and should have expected – each of the modernizations to result in a significant emissions increase when compared to the actual amount of pollution from each unit during the required two-year PSD baseline period, which was zero. The zero baseline is compelled by the law, common sense, and the facts of this case. After all, the express purpose of the PMP was to revive units that otherwise would have been retired: If not for Duke's decision to comprehensively renovate the units and return them to service, emissions from each unit would have *remained* zero. Accordingly, the court should enter summary judgment for Plaintiffs on all thirteen claims.

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[6] For comparison, the table includes the work in *WEPCo*, which was considered "far from" routine; many courts have found much less extensive work non-routine. Pls. SJ Br. (ECF 435), at 13-18. Most recently, after argument in this case, the court in *United States v. La. Generating* found $4.5 million reheater replacements to be non-routine. No. 09-CV-100, 2012 WL 4107129 (M.D. La. Sept. 19, 2012).

Unit	Nature & Extent	Cost	$ per kW	Purpose	Frequency
WEPCo	***Nine month outages*** at five 80 MW units. Capital improvements to rehabilitate aging units, including replacement of major components such as steam drums and air heaters, and renovation of mechanical, electrical, and support systems Pls. SJ Br., Ex. 26 (ECF 435-27)	$70.5 million total $14.1 million per unit	$176	Life extension as alternative to retirement	Once or twice during a unit's expected life cycle; company unable to identify comparable projects that would be considered routine.
PMP	Capital improvements to modernize units that otherwise would have been retired, including replacement and renovation of major boiler, turbine, and generator components, and plant control systems. Necessary work identified after months-long studies, treated as a major project, and characterized as being different than routine maintenance. Approval at highest level of company required for each project.	$300 million $17 to $36 million per unit	$245	Life extension as alternative to retirement Addition of new megawatt capacity to the generating fleet	One time (end-of-life) refurbishment of each unit, which otherwise would have been retired; no evidence that similar total renovations would be considered routine.
Allen 1 *165 MW*	***Six year outage***: reheater, burner panels, bottom ash tubes; control and ignition systems, feedwater heaters; turbine/generator renovation	$ 23.6 million	$143	See above for common PMP purpose	See above for frequency applicable to each unit. In addition, before resuming operation of Allen 2 (the first of the thirteen units to be renovated) Duke determined that there was simply "not much experience in
Allen 2 *165 MW*	***Five year outage***: reheater, burner panels, control and ignition systems, feedwater heaters; generator renovation	$23.1 million	$140		
Buck 3 *75 MW*	***Ten year outage***: waterwalls, backpass, and superheater; ignition system, feedwater heaters, generator renovation	$34.4 million	$430		
Buck 4 *38 MW*	***Ten year outage***: waterwalls, backpass, and superheater; ignition system, feedwater heaters, generator renovation	$17.7 million	$441		

Unit	Nature & Extent	Cost	$ per kW	Purpose	Frequency
Buck 5 *128 MW*	***Six year outage***: waterwalls, superheater, reheater, economizer side wall; ignition system, feedwater heaters; generator renovation	$36.1 million	$288		the industry" to draw from when it was investigating best practices for resuming operations of long-laid up units.
Cliff-side 1 *38 MW*	***Ten year outage***: waterwalls, backpass, and superheater; ignition system, feedwater heaters, generator renovation	$19.7 million	$491		
Cliff-side 2 *38 MW*	***Nine year outage***: waterwalls, backpass, and superheater; ignition system, feedwater heaters, generator renovation	$22.9 million	$572		
Cliff-side 3 *61 MW*	***Six year outage***: waterwalls, superheater, upper economizer; ignition system, feedwater heaters, turbine/generator renovation	$28.5 million	$439		
Cliff-side 4 *61 MW*	***Seven year outage***: waterwalls, superheater, upper economizer; ignition system; feedwater heaters, generator renovation	$21.8 million	$335		
Dan River 3 *142 MW*	***Three year outage***: waterwalls, superheater, reheater, economizer section; ignition system, feedwater heaters	$21.3 million	$141		
River-bend 4 *95 MW*	***Three year outage***: waterwalls, reheater; control and ignition systems, feedwater heaters	$17.2 million	$172		
River-bend 6 *133 MW*	***Seven year outage***: waterwalls, superheater, reheater; ignition system, feedwater heaters, turbine renovations	$34.75 million	$261		
River-bend 7 *133 MW*	***Six year outage***: waterwalls, superheater, reheater; ignition system, feedwater heaters, turbine renovations	$34.75 million	$261		

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Respectfully Submitted,

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CERTIFICATE OF SERVICE

I hereby certify that on May 28, 2013, the foregoing Supplemental Memorandum in Support of Plaintiffs' Motion for Summary Judgment was filed electronically using the Court's ECF system and automatically served through the Court's ECF system on counsel of record.

/s/ Jason A. Dunn

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